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the Yenakiyevskiy and Makeyevskiy metallurgical plants in the Donbas, the Kransyy Oktyabr' Plant in Stalingrad and the Nadezhdenskiy Plant in the Ural Mountains, in their reports of total steel production to the Chief Administration of Metallurgical Industry in Moscow, included steel ingots and steel castings.

The method used in reporting production in steel-rolling shops to the Chief Administration of Metallurgical Industries (GUMP) was to show, for individual steel furnaces, the total figure of steel production irrespectively of whether steel was used to make castings in foundries or ingots in rolling shops.

A study of summarized reports submitted by the GUMP to the government would reveal that the statistical data of steel production submitted by individual plants were included unchanged in summarized reports.

The secret order of the SNK USSR /The Council of People's Commissars USSR/ and TsK VKP (b) /The Central Committee of the Communist Party/ concerning the development of the USSR industry in 1941 also shows that both ingots and castings were included in the total figures for production of steel in the USSR.

For instance, the decree of the SNK USSR and Tsk VKP (b) fixing the annual production of steel in USSR at 22,400,000 tons for 1941, included also producers that manufactured only castings and no ingots. A table showing the fixed steel production and individual producers, which was taken from the above mentioned decree, follows:

TOTAL STEEL PRODUCTION IN THE USSR IN 1941 (according to the decree)

22,400,000 tons

Narkomchermet /The People's Commissariat of Ferrous Metallurgy/	17,800,000 tons
Heavy Machine Building	850,000
Medium Machine Building	650,000 "
General Machine Building	46,000
Petroleum Industry	[illegible] "
Coal Industry	80,00[illegible] "

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NKPS /The People' Commissariat of Communications/	180,000	tons
People's Commissariat of Local Industries RSFSR	45,000	"
Electric Power Stations	13,600	"
Electrical Industry	247,700	"
Non-ferrous metallurgy	34,500	"
Building materials	16,000	"
The People's Commissariat of Timber Industry	14,000	"
Others	2,395,400	"
	22,400,000	tons

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[redacted]

These over-all figures of annual production include the rolling of profile iron as well as forged products and pipes.

[redacted]

Rolled steel production (annual), including pipes and forge products for 1941:

	15,800,000	tons
Narkomchermet	13,380,000	tons
Heavy Machine Building	450,000	"
Medium Machine Building	100,000	"
General Machine Building	16,500	"
Petroleum industry	13,000	"
Local industries RSFR	82,000	"
Electrical industry	96,500	"
Non-ferrous metallurgy	26,000	"
People's Commissariat of Timber Industry	8,100	"
Local industries USSR	8,000	"
Local industries BSSR	4,000	"
Miscellaneous	1,915,900	"
	15,800,000	tons

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[redacted]

Steel produced by machine-building plants is included in the total steel production of the USSR. The table given in Paragraph (1) above, which shows steel production decreed by the SNK USSR and TsK VKP (b) for 1941, includes also machine-building plants. In individual cases, incomplete figures of annual steel production in the USSR may sometimes be encountered; one should assess the source of information.

[redacted]

In the USSR, the technical personnel of plants, the directors, and the political authorities, both local and central, as well as the Kremlin lords, are interested in obtaining high production coefficients, which are [redacted] in plant and operations as the plants.

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The security not only of the technical personnel and directors of the plants, but in a large measure, also that of the political leaders of the okrugs and, even, people's commissariats (now ministries) depends on be successful performance of factories and plants.

The conditions of work in the USSR, however, are such that only through the frequent use of illegal means and fraud can the appearance of good performance in plants be achieved. The low quality of raw materials and fuel, the poor system of supply, the unsatisfactory performance of railroads, the lack of qualified workers, and other causes often place metallurgical plants in a very difficult situation.

[redacted] in order to improve the coefficient of work of blast furnaces under the tacit instructions of the director of the plant, green sand from slag dumps would be supplied for the use in furnace charges in increased quantities (10-15%) during several months, without debiting this to the furnace charges in the books. 50X1-HUM

As a rule, almost all metallurgical plants showed a considerable shortage of ore, coke, and other raw materials and semi-manufactured products in their annual reports on the production, cost of production, and verified balance of raw materials or hand. Very often production coefficients are not corrected on the basis of the discovered shortages of materials, because overexpenditures are written off. Complete annual reports usually arrive very late, when no one is interested in them any more, since coefficients which have been received in incorrect preliminary reports (showing higher coefficients) are accepted and used in over-all reports before the Chief Administrations (Ministries) receive the final reports. The "difficulty coefficients" often served to improve production efficiency in open-hearth furnaces and rolling shops.

In casting and rolling there are steels with a difficulty coefficient of 2 and higher, and varieties of rolling with coefficients of 3-4.

Therefore, the larger the amount of special material manufactured by a plant, the greater is the difference between the nominal quantity of steel and rolled iron and the actual weight produced.

With an increased difficulty coefficient, the actual gain in production sharply increases the production coefficients. Thus, technical coefficients shown in metallurgical production are not reliable, because in the majority of cases they are exaggerated.

5. [redacted] 50X1-HUM

The capacity of open-hearth furnaces in the USSR was determined on the basis of the hearth area at the level of the molten metal thresholds of the charging doors.

The level of the "nasypnyye" thresholds [meaning not clear; literally "filling level"] of the charging doors was very often the accepted practice not only because working conditions rendered it compulsory but also because of the increase in charging in an attempt to raise the productivity of a furnace and produce more metal. However, also in such cases the quantity of steel taken from a square meter of the hearth was computed on the basis of the established size of the hearth at the level of the metal thresholds of the charging doors.

Under the prevailing conditions of production the presence of the filling (nasypnyye) thresholds was easily explained by the excess of slag at the beginning of the second half of the open-hearth melting process, during the foaming period, when slag usually bulges and fills a large volume. Thus, no special explanations were required, and [redacted] worked with high filling (nasypnyye) thresholds, just taking care that the foaming slag, as the depth of the metal bath increased, did not run over the gas ports. 50X1-HUM

The bottoms of the gas ports were usually designed 500 millimeters high for ore processes and 350 millimeters for scrap.

The 1925 norms of Academician M.A. Pavlov yielded 1.5 tons of steel per square meter of hearth.

The capacity of the newest stationary open-hearth furnaces was estimated on the basis of 3 tons per square meter of hearth. Large rocking furnaces had 3-4 tons per square meter.

[redacted] the results of the work of open-hearth furnaces in the southern part of the USSR in prewar years were roughly as follows: 50X1-HUM

(a) Exceptionally high production of a furnace - 7 tons per square meter of hearth.

(b) Very good, comparatively rare, results - 5-6 tons per square meter.

(c) Good - 4-5 tons per square meter

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(d) Average - 3.5-4 tons per square meter

(e) Below average - 2.5-3 tons per square meter

The coefficients in the Urals were considerably lower than those in the South.

5. 50X1-HUM

The designations of rolling mills in the USSR differ little from those usually found in foreign literature.

The diameter and the length of rolls characterize a rolling mill, but usually other data are also necessary. Cited below are examples of designation of rolling mills built according to the specifications prevailing in the USSR mills:

Three-high sheet-rolling mill:

(a) Purpose: sheet rolling

(b) Weight: 380 tons

(c) Technical characteristics and basic measurements: The mill rolls sheet iron from 6 to 30 millimeters thick, up to 2,200 millimeters wide; the average 24-hour capacity is 500 tons.

The stand of the mill has 3 rolls: the upper one and the lower one with a diameter of 860 millimeters, and the middle roll with a diameter of 560 millimeters. The length of the barrel of the rolls is 2,540 millimeters. The middle roll is balanced hydraulically. The mill is equipped on both sides with lifting /roller-conveyer/ platforms, each 9,710 millimeters long and 2,300 millimeters wide. The measurements of the platform rollers are as follows: diameter - 375 millimeters, length - 1,825 millimeters, distance between centers - 395 millimeters. The platforms are lifted by hydraulic power.

The pressure mechanism of the stand works by electricity. The mill is equipped with a table for feeding ingots from the furnace. The length of the table is 9,380 millimeters and the width, 1,664 millimeters. The table rollers are 400 millimeters in diameter, 1,390 millimeters long, and the distance between the center of the rollers is 450 millimeters.

(d) The driving gear and motors: The driving asynchronous motor is a 6,000-volt, 300-ampere type with a capacity of 1,840 kilowatts and making 75 revolutions per minute. The motor of the pressure mechanism is a 220-volt, 44-kilowatt type, operating at 500 revolutions per minute. The motor moving the rollers of the lifting platforms is 60-kilowatt motor, operating at 570 revolutions per minute; and the one feeding ingots from the furnace is a 9-kilowatt motor.

The Pilger Mill

(a) Purpose: rolling of pipes

(b) Weight: 265.7 tons

(c) Technical description: A pilger mill has 2 working and 2 gear /big/ stands and is operated by a direct-current motor. One of the rolls, equipped with a motor, has a flywheel 6,500 millimeters in diameter, weighing 60 tons, with a cast iron hub, steel rim, and wrought iron spokes. Both stands are joined to the motor roll of the flywheel by a coupling with a hydraulic clutch and release. Thanks to this arrangement both mills can work simultaneously, or one mill can work alone. The gear stand of each of the mills is of closed construction. The shafts connecting the gear with the working rolls have articulated joints on the side where they are connected with the gear. The shafts have hydraulic balancing.

The working stand is a steel frame, in which 2 working rolls with a special grooved profile are placed. The upper roll is operated by an electric motor. The balancing is hydraulic.

On the entry side of the pilger mill there is a feeding apparatus (Forgeller) driven by 2 hydraulic cylinders. The diameter of the cylinders is 300 millimeters, the stroke of the piston is 10,300 millimeters. In the upper part of the carriage in the bearings /big/ a mandrel piston /shaft?/ is installed, which can move back and forth in the carriage. The back end of this shaft enters through the stuffing box into the air cylinder which is connected with the air reservoir. The compressed air serves as a buffer when, in rolling back, the mandrel roll together with the sleeve is pushed away, and the same compressed air pushes the mandrel with the sleeve forward during the period of opening of the roller grooves. The diameter of the air cylinder is 550 millimeters. The stroke of the piston is 1,600 millimeters.

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The pressure mechanism of the stand works by electricity. The mill is equipped with a table for feeding ingots from the furnace. The length of the table is 9,380 millimeters and the width, 1,364 millimeters. The table rollers are 400 millimeters in diameter, 1,390 millimeters long, and the distance between the center of the rollers is 450 millimeters.

(d) The driving gear and motors: The driving asynchronous motor is a 6,000-volt, 300-ampere type with a capacity of 1,840 kilowatts and making 75 revolutions per minute. The motor of the pressure mechanism is a 220-volt, 44-kilowatt type, operating at 500 revolutions per minute. The motor moving the rollers of the lifting platforms is 60-kilowatt motor, operating at 570 revolutions per minute; and the one feeding ingots from the furnace is a 9-kilowatt motor.

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Between the mill and the feeding apparatus there is a platform which descends and ascends from the hydraulic cylinder.

Every stand of a pilger mill has a device for cooling and changing the mandrels.

(d) Driving gear and motors. The motor is a 1,650-kilowatt, 700-volt type, with the number of revolutions regulated within the limits of 70-90 per minute. The electric motor for the flywheel is a 22-kilowatt, 380-volt motor operating at 750 revolutions per minute. The electric motor for the pilger mill rollers is a 39-kilowatt motor operating at 750 revolutions per minute. The one for cooling the mandrels is a 31-kilowatt operating at 750 revolutions per minute. The water pressure has 100 atmospheres. The air pressure is 6 atmospheres.

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